

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

These amendments introduce no new matter and support for the amendment is replete throughout the specification and claims as originally filed. These amendments are made without prejudice and are not to be construed as abandonment of the previously claimed subject matter, or agreement with any objection or rejection of record.

Listing of Claims:

1. **(Currently amended)** A composition comprising an orthogonal aminoacyl-tRNA synthetase (O-RS), wherein the O-RS preferentially aminoacylates an O-tRNA with *p*-acetyl-L-phenylalanine ~~with an efficiency of at least 50% of the efficiency of a translation system comprising *p*-acetyl-L-phenylalanine, said O-tRNA, and a polypeptide comprising ; and,~~ wherein the O-RS comprises an amino acid sequence selected from SEQ ID NO.: 18[[-20]] or a conservative variation thereof comprising at least 80% sequence identity with SEQ ID NO: 18.
2. **(Currently amended)** The composition of claim 1, wherein the O-RS comprises ~~an amino acid sequence comprising any one of SEQ ID NO.: 18-20, or a conservative variation thereof~~ Ala or Leu at position corresponding to position 32, or comprises Gly at a position corresponding to position 158.
3. **(Previously presented)** The composition of claim 1, wherein the O-RS is derived from a *Methanococcus jannaschii*.
4. **(Previously presented)** The composition of claim 1, comprising a cell, wherein said cell comprises said O-RS.
5. **(Original)** The composition of claim 4, wherein the cell is an *E. coli* cell.
6. **(Original)** The composition of claim 1, comprising a translation system.

7. **(Previously presented)** The composition of claim 1, further comprising said O-tRNA.
8. **(Original)** The composition of claim 7, wherein the O-tRNA comprises or is encoded by a polynucleotide sequence of SEQ ID NO.: 21.
9. **(Currently amended)** A cell comprising a translation system, wherein the translation system comprises:
 - an orthogonal-tRNA (O-tRNA);
 - an orthogonal aminoacyl-tRNA synthetase (O-RS); and,
 - p*-acetyl-L-phenylalanine;wherein the O-RS preferentially aminoacylates the O-tRNA with *p*-acetyl-L-phenylalanine ~~with an efficiency of at least 50% of the efficiency of a translation system comprising *p*-acetyl-L-phenylalanine, said O-tRNA, and a polypeptide comprising~~ wherein the O-RS comprises an amino acid sequence selected from SEQ ID NO.: 18[[-20]] or a conservative variation thereof comprising at least 80% sequence identity with SEQ ID NO: 18 and comprising Ala or Leu at position corresponding to position 32 or comprising Gly at a position corresponding to position 158.
10. **(Currently amended)** The cell of claim 9, wherein the O-tRNA comprises or is encoded by a polynucleotide sequence as set forth in SEQ ID NO.: 21, or a complementary polynucleotide sequence thereof, ~~and wherein the O-RS comprises an amino acid sequence comprising any one of SEQ ID NO.: 18-20, or a conservative variation thereof.~~
11. **(Cancelled)**
12. **(Original)** The cell of claim 9, wherein the cell is a non-eukaryotic cell.
13. **(Original)** The cell of claim 12, wherein the non-eukaryotic cell is an *E. coli* cell.
14. **(Previously presented)** The cell of claim 9, further comprising a nucleic acid that comprises a polynucleotide that encodes a polypeptide of interest, wherein the polynucleotide comprises at least one selector codon that is recognized by the O-tRNA.
15. **(Currently amended)** An *E. coli* cell, comprising:
 - an orthogonal tRNA (O-tRNA);

an orthogonal aminoacyl- tRNA synthetase (O-RS), wherein the O-RS preferentially aminoacylates the O-tRNA with *p*-acetyl-L-phenylalanine ~~with an efficiency of at least 50% of the efficiency of a translation system comprising *p*-acetyl-L-phenylalanine, said O-tRNA, and a polypeptide comprising~~ wherein the O-RS comprises an amino acid sequence selected from SEQ ID NO.: 18[[-20]] or a conservative variation thereof comprising at least 80% sequence identity with SEQ ID NO: 18 and comprising Ala or Leu at position corresponding to position 32 or comprising Gly at a position corresponding to position 158;

p-acetyl-L-phenylalanine; and,

a nucleic acid that comprises a polynucleotide that encodes a polypeptide of interest, wherein the polynucleotide comprises at least one selector codon that is recognized by the O-tRNA.

16. (Currently amended) The *E. coli* cell of claim **15**, wherein the O-tRNA comprises or is encoded by a polynucleotide sequence as set forth in SEQ ID NO.: 21, or a complementary polynucleotide sequence thereof, ~~and wherein the O-RS comprises an amino acid sequence comprising any one of SEQ ID NO.: 18-20, or a conservative variation thereof.~~

17. (Currently amended) An artificial polypeptide comprising any one of SEQ ID NO. 18[[-20]].

18. (Withdrawn) An artificial polynucleotide that encodes a polypeptide of claim **17**.

19. (Withdrawn) A vector comprising or encoding a polynucleotide of claim **18**.

20. (Withdrawn) The vector of claim **19**, wherein the vector comprises a plasmid, a cosmid, a phage, or a virus.

21. (Withdrawn) The vector of claim **19**, wherein the vector is an expression vector.

22. (Withdrawn) A cell comprising the vector of claim **19**.

23. (Withdrawn) A method of producing in a cell a protein of interest with a *p*-acetyl-L-phenylalanine at a specified position, the method comprising:

growing, in an appropriate medium, the cell, where the cell comprises a nucleic acid that comprises at least one selector codon at a defined position and encodes the a protein of interest; and,

providing in the appropriate medium *p*-acetyl-L-phenylalanine;

wherein the cell further comprises:

an orthogonal tRNA (O-tRNA) that functions in the cell and recognizes the selector codon; and,

an orthogonal aminoacyl-tRNA synthetase (O-RS) that preferentially aminoacylates the O-tRNA with *p*-acetyl-L-phenylalanine with an efficiency of at least 50% of the efficiency of a translation system comprising *p*-acetyl-L-phenylalanine, said O-tRNA, and a polypeptide comprising an amino acid sequence selected from SEQ ID NO.: 18-20; and

incorporating *p*-acetyl-L-phenylalanine at the specified position in the protein of interest during translation of the protein of interest, wherein the defined position of said at least one selector codon in said nucleic acid corresponds to said specified position of *p*-acetyl-L-phenylalanine in said protein of interest, thereby producing the protein of interest with *p*-acetyl-L-phenylalanine at the specified position.

24. (Withdrawn) The method of claim **23**, wherein the O-RS comprises an amino acid sequence which comprises any one of SEQ ID NO.: 18-20, or a conservative variation thereof.

25. (Withdrawn) The method of claim **23**, wherein the O-tRNA comprises or is encoded by a polynucleotide sequence as set forth in SEQ ID NO.: 21, or a complementary polynucleotide sequence thereof.

26. (Withdrawn) The method of claim **23**, wherein the cell is a non-eukaryotic cell.

27. (Withdrawn) The method of claim **26**, wherein the non-eukaryotic cell is an *E. coli* cell.

28. (Cancelled)